



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/060,826	02/01/2002	Daniel S. Pickard	IB-1581	9952
8076	7590	10/27/2003	EXAMINER	
LAWRENCE BERKELEY NATIONAL LABORATORY ONE CYCLOTRON ROAD, MAIL STOP 90B UNIVERSITY OF CALIFORNIA BERKELEY, CA 94720			LEE, WILSON	
			ART UNIT	PAPER NUMBER
			2821	

DATE MAILED: 10/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/060,826

Applicant(s)

PICKARD ET AL.

Examiner

Wilson Lee

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/6/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Claim Objections

Claim 18 is objected to because of the following informalities:

In claim 18, "multicusp" should be changed to --multi-cusp--.

Appropriate correction is required.

Claim Rejections – 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 11, 12, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Mavretic et al. (6,424,232)

Regarding Claim 1, Mavretic discloses a matching network (See Figures 2 and 3) for coupling an RF supply (210) to an RF antenna (load) in a plasma generator (See Col. 2, line 66 to Col. 3, line 19) comprising:

- a resonantly tunable circuit formed of a variable capacitor (306) and an inductor (307) in a series resonance configuration;
- a ferrite core transformer (305) coupled to the resonantly tunable circuit.

Regarding Claim 2, Mavretic discloses that the transformer comprises a secondary winding (right side winding of transformer 305) which couples the

transformer to the tunable circuit and a primary winding (left side winding of transformer 305) (See Figure 3).

Regarding Claim 11, Mavretic discloses a RF power supply (30) connected through a 50 Ω coaxial cable (303) (See Col. 2, lines 29-30 and Col. 4, lines 26-30) to an input of the matching network and an RF antenna (load) connected to an output of the matching network.

Regarding Claim 12, Mavretic discloses a plasma ion or electron source (See Figures 2 and 3) comprising:

- an RF power supply (210);
- a coaxial cable (303) connected to the RF power supply (210);
- a matching network (220) having an input connected to the coaxial cable (303), the matching network comprising: a resonantly tunable circuit formed of a variable capacitor (306) and an inductor (307) in a series resonance configuration; a ferrite core transformer (305) coupled to the resonantly tunable circuit; an RF antenna (230 or load) connected to an output of the matching network (220), a plasma ion or electron generator (plasma chamber) having the RF antenna mounted therein for inductively generating a plasma (See Col. 5, lines 19-62).

Regarding Claim 13, Mavretic discloses that the transformer comprises a secondary winding (right side winding of transformer 305) which couples the transformer to the tunable circuit and a primary winding (left side winding of transformer 305) (See Figure 3).

Claim Rejections – 35 U.S.C. 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, 6-10, 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mavretic et al. (6,424,232) in view of Patrick et al. (5,578,165).

Regarding Claim 3, Mavretic, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the secondary winding is a single turn winding and the primary winding is a multi-turn winding. However, Patrick discloses that the secondary winding is a single turn winding and the primary winding is a multi-turn winding (See Figure 3 and Col. 3, lines 8-24). It would have been obvious to one of ordinary skill in the art to tune the windings of Mavretic such as secondary winding is a single turn and primary winding is multi-turn as taught by Patrick in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation.

Regarding Claims 4, Mavretic, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the transformer comprises a core (between two windings) which is made of a plurality of ferrite cores. However, it would have been obvious to one of ordinary skill in the art to provide a plurality of ferrite cores in Mavretic to regulate the magnetic field in order to attain a desired voltage output. It is

Art Unit: 2821

held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. vs Bemis Co.*, 193 USPQ 8.

Regarding Claim 6, Mavretic, as discussed above, essentially discloses the claimed invention but fails to disclose that the turn ratio between the primary winding and the secondary winding ranges from 3:1 to 8:1. However, Patrick discloses that the ratio is 4:1 (See Figure 3). It would have been obvious to one of ordinary skill in the art to adapt the ratio of Patrick in Mavretic in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation.

Regarding Claim 7, Mavretic discloses that the turn ratio of the windings is selected to transform the plasma impedance of the plasma generator to 50 Ω (See Col. 4, line 61 to Col. 5, line 18).

Regarding Claim 8, Mavretic, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the transformer comprises a core being made of 12 ferrite cores with 1.25 inch OD and 0.75 inch ID, being made of M-type ferrite. However, it would have been obvious to one of ordinary skill in the art to utilize any number of commercial available ferrite cores with specific dimension in Mavretic to match with the source and load in order to attain desired voltage output. It is held to be within the general skill of a worker in the art to select a known commercial material and type of a device on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding Claim 9, Mavretic discloses a variable capacitor (306) but does not disclose the capacitor having capacity range of 5-125pF. However, it would have been

Art Unit: 2821

obvious to one of ordinary skill in the art to tune the capacitance of the capacitor to any desired range in order to attain desired output. It is held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA 1955).

Regarding Claim 10, Mavretic, as discussed above, essentially discloses the claimed invention but fails to disclose that the matching network fits within a cylindrical cavity 6 inches in diameter and 8 inches long. However, it would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding Claim 14, Mavretic, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the secondary winding is a single turn winding and the primary winding is a multi-turn winding. However, Patrick discloses that the secondary winding is a single turn winding and the primary winding is a multi-turn winding (See Figure 3 and Col. 3, lines 8-24). It would have been obvious to one of ordinary skill in the art to tune the windings of Mavretic such as secondary winding is a single turn and primary winding is multi-turn as taught by Patrick in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation.

Regarding Claim 15, Mavretic, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the transformer comprises a core (between two windings) which is made of a plurality of ferrite cores. However, it would

have been obvious to one of ordinary skill in the art to provide a plurality of ferrite cores in Mavretic to regulate the magnetic field in order to attain a desired voltage output. It is held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. vs Bemis Co.*, 193 USPQ 8.

Regarding Claim 16, Mavretic, as discussed above, essentially discloses the claimed invention but fails to disclose that the turn ratio between the primary winding and the secondary winding ranges from 3:1 to 8:1. However, Patrick discloses that the ratio is 4:1 (See Figure 3). It would have been obvious to one of ordinary skill in the art to adapt the ratio of Patrick in Mavretic in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation.

Regarding Claim 17, Mavretic discloses that the coaxial cable has an impedance of 50 Ω (See Col. 4, lines 26-30) and the turn ratio of the windings is selected to transform the plasma impedance of the plasma generator to 50 Ω (See Col. 4, line 61 to Col. 5, line 18).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mavretic et al. (6,424,232).

Regarding Claim 5, Mavretic, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the transformer comprises a core (between two windings) which is made of a plurality of ferrite cores. However, it would have been obvious to one of ordinary skill in the art to provide a plurality of ferrite cores in Mavretic to regulate the magnetic field in order to attain a desired voltage output. It is

held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. vs Bemis Co.*, 193 USPQ 8.

Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mavretic et al. (6,424,232) in view of Ichimura et al. (5,750,987).

Regarding Claim 18, as discussed above, Mavretic essentially discloses the claimed invention but fails to explicitly disclose a multi-cusp plasma generator. However, Ichimura discloses a ion beam apparatus using magnet trains arranged outside of the plasma chamber can generate a multi-ring cusp having a comparatively strong intensity so that the neutralized plasma can be generated much the more easily (See Col. 8, line 62 to Col. 9, line 6). It would have been obvious to one of ordinary skill in the art to adapt the teaching of Ichimura, using magnet trains arranged in Mavretic, in order to obtain the above advantage such as much easily to generate neutralized plasma.

Regarding Claim 19, the combination of Ichimura and Mavretic discloses that the source is a part of a compact focused ion beam the system.

Regarding Claim 20, Mavretic, as discussed above, essentially discloses the claimed invention but fails to disclose that the matching network fits within a cylindrical cavity 6 inches in diameter and 8 inches long. However, it would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Response to Arguments

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

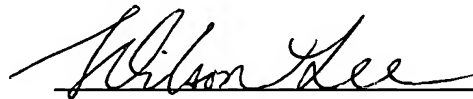
Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Weber (4,284,490) discloses a RF sputtering apparatus including multi-network power supply. Brown et al. (4,952,843) discloses a high current ion source.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Wilson Lee whose telephone number is (703) 306-3426.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (703) 308-0956. The Technology Center Fax Center number is (703) 308-7722 or (703) 308-7724.

A handwritten signature in cursive script, reading "Wilson Lee", written over a horizontal line.

Wilson Lee
Patent Examiner
U.S. Patent & Trademark Office

WL
10/18/03